

Montana Water Supply Forecasts as of February 1st, 2017

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How forecasts are made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Natural Resources Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis at SNOTEL sites and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and forecasts will move closer to the most probable forecast.

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Kootenai River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| <i>Tobacco R nr Eureka</i> | APR-JUL | 87 | 104 | 115 | 91% | 126 | 143 | 126 |
| | APR-SEP | 94 | 113 | 126 | 90% | 139 | 158 | 140 |
| <i>Libby Reservoir Inflow¹</i> | APR-JUL | 4030 | 4660 | 4940 | 93% | 5220 | 5850 | 5340 |
| | APR-SEP | 4900 | 5480 | 5750 | 92% | 6020 | 6600 | 6250 |
| <i>Fisher R nr Libby</i> | APR-JUL | 87 | 131 | 160 | 78% | 189 | 230 | 205 |
| | APR-SEP | 97 | 142 | 172 | 78% | 205 | 245 | 220 |
| <i>Yaak R nr Troy</i> | APR-JUL | 260 | 315 | 355 | 85% | 395 | 455 | 420 |
| | APR-SEP | 275 | 335 | 375 | 85% | 415 | 475 | 440 |
| <i>Kootenai R at Leonia^{1,2}</i> | APR-JUL | 4830 | 5670 | 6050 | 92% | 6430 | 7270 | 6600 |
| | APR-SEP | 5750 | 6550 | 6920 | 91% | 7290 | 8090 | 7590 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Flathead River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | 30yr Avg (KAF) |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| <i>NF Flathead R nr Columbia Falls</i> | APR-JUL | 1230 | 1380 | 1470 | 95% | 1570 | 1720 | 1540 |
| | APR-SEP | 1370 | 1520 | 1630 | 96% | 1730 | 1890 | 1700 |
| <i>MF Flathead R nr West Glacier</i> | APR-JUL | 1110 | 1270 | 1380 | 92% | 1500 | 1660 | 1500 |
| | APR-SEP | 1220 | 1390 | 1510 | 93% | 1620 | 1790 | 1630 |
| <i>Sf Flathead R nr Hungry Horse</i> | APR-JUL | 860 | 995 | 1080 | 89% | 1170 | 1300 | 1210 |
| | APR-SEP | 920 | 1060 | 1150 | 89% | 1240 | 1380 | 1290 |
| <i>Hungry Horse Reservoir Inflow^{1,2}</i> | APR-JUL | 1350 | 1630 | 1750 | 94% | 1880 | 2150 | 1860 |
| | APR-SEP | 1450 | 1740 | 1870 | 94% | 2000 | 2280 | 1980 |
| <i>Flathead R at Columbia Falls²</i> | APR-JUL | 3930 | 4390 | 4700 | 94% | 5020 | 5480 | 5020 |
| | APR-SEP | 4320 | 4800 | 5130 | 94% | 5460 | 5940 | 5450 |
| <i>Ashley Ck nr Marion²</i> | MAR | 0.12 | 0.59 | 0.9 | 76% | 1.22 | 1.69 | 1.19 |
| | APR-JUL | 2.9 | 4.3 | 5.3 | 82% | 6.2 | 7.6 | 6.5 |
| <i>Swan R nr Bigfork</i> | APR-JUL | 365 | 425 | 465 | 89% | 500 | 560 | 520 |
| | APR-SEP | 420 | 485 | 525 | 88% | 570 | 635 | 595 |
| <i>Flathead Lake Inflow^{1,2}</i> | APR-JUL | 4200 | 5030 | 5420 | 93% | 5800 | 6640 | 5810 |
| | APR-SEP | 4580 | 5470 | 5880 | 94% | 6280 | 7170 | 6270 |
| <i>Mill Ck ab Bassoo ck nr Niarada</i> | APR-JUL | 1.91 | 2.9 | 3.6 | 90% | 4.2 | 5.2 | 4 |
| | APR-SEP | 2.2 | 3.2 | 3.9 | 89% | 4.5 | 5.5 | 4.4 |
| <i>South Crow Ck nr Ronan</i> | APR-JUL | 7 | 8.5 | 9.4 | 93% | 10.4 | 11.8 | 10.1 |
| | APR-SEP | 8 | 9.6 | 10.7 | 92% | 11.8 | 13.4 | 11.6 |
| <i>Mission Ck nr St. Ignatius</i> | APR-JUL | 20 | 22 | 24 | 96% | 25 | 28 | 25 |
| | APR-SEP | 24 | 26 | 28 | 93% | 30 | 33 | 30 |
| <i>SF Jocko R nr Arlee</i> | APR-JUL | 21 | 26 | 29 | 88% | 33 | 38 | 33 |
| | APR-SEP | 24 | 30 | 33 | 89% | 37 | 42 | 37 |
| <i>NF Jocko R bl Tabor Feeder Canal</i> | APR-JUL | 23 | 27 | 29 | 94% | 31 | 34 | 31 |
| | APR-SEP | 25 | 28 | 31 | 94% | 33 | 36 | 33 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

*Upper Clark Fork River
Basin*

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| <i>Little Blackfoot nr Garrison</i> | APR-JUL | 29 | 47 | 59 | 84% | 71 | 88 | 70 |
| | APR-SEP | 33 | 52 | 65 | 84% | 78 | 97 | 77 |
| <i>Flint Ck nr Southern Cross</i> | APR-JUL | 4.2 | 8.1 | 10.7 | 86% | 13.4 | 17.2 | 12.4 |
| | APR-SEP | 4.3 | 9.2 | 12.5 | 86% | 15.8 | 21 | 14.6 |
| <i>Flint Ck bl Boulder Ck</i> | APR-JUL | 21 | 36 | 46 | 88% | 56 | 71 | 52 |
| | APR-SEP | 28 | 46 | 58 | 88% | 71 | 89 | 66 |
| <i>Lower Willow Ck Reservoir Inflow²</i> | APR-MAY | 3.3 | 5.7 | 7.3 | 100% | 9 | 11.4 | 7.3 |
| | APR-JUL | 4.7 | 8.4 | 10.9 | 103% | 13.4 | 17.1 | 10.6 |
| <i>MF Rock Ck nr Philipsburg</i> | APR-JUL | 31 | 41 | 48 | 83% | 55 | 65 | 58 |
| | APR-SEP | 36 | 47 | 55 | 85% | 62 | 73 | 65 |
| <i>Rock Ck nr Clinton</i> | APR-JUL | 114 | 165 | 200 | 80% | 235 | 285 | 250 |
| | APR-SEP | 140 | 195 | 235 | 84% | 270 | 325 | 280 |
| <i>Clark Fork R ab Milltown</i> | APR-JUL | 176 | 325 | 425 | 80% | 525 | 670 | 530 |
| | APR-SEP | 240 | 400 | 510 | 83% | 620 | 780 | 615 |
| <i>Nevada Ck nr Helmville</i> | APR-MAY | 1.69 | 5 | 7.2 | 86% | 9.4 | 12.7 | 8.4 |
| | APR-JUL | 3.5 | 8.9 | 12.5 | 88% | 16.1 | 21 | 14.2 |
| <i>Blackfoot R nr Bonner</i> | APR-JUL | 385 | 500 | 580 | 81% | 665 | 780 | 720 |
| | APR-SEP | 440 | 570 | 655 | 82% | 740 | 870 | 800 |
| <i>Clark Fork R ab Missoula</i> | APR-JUL | 590 | 840 | 1010 | 81% | 1180 | 1430 | 1250 |
| | APR-SEP | 725 | 990 | 1170 | 82% | 1350 | 1620 | 1420 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Bitterroot River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| WF Bitterroot R Nr Conner ² | APR-JUL | 60 | 88 | 108 | 84% | 127 | 156 | 128 |
| | APR-SEP | 64 | 96 | 118 | 85% | 140 | 173 | 139 |
| Bitterroot R Nr Darby | APR-JUL | 235 | 320 | 380 | 86% | 440 | 525 | 440 |
| | APR-SEP | 265 | 350 | 410 | 86% | 470 | 555 | 475 |
| Como Reservoir Inflow ² | APR-JUL | 57 | 64 | 69 | 91% | 74 | 81 | 76 |
| | APR-SEP | 60 | 68 | 73 | 92% | 78 | 85 | 79 |
| Bitterroot R nr Missoula | APR-JUL | 705 | 885 | 1010 | 88% | 1130 | 1310 | 1150 |
| | APR-SEP | 790 | 980 | 1110 | 89% | 1240 | 1430 | 1250 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Lower Clark Fork River

Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|-------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Clark Fork R bl Missoula | APR-JUL | 1340 | 1750 | 2030 | 85% | 2310 | 2730 | 2400 |
| | APR-SEP | 1550 | 1990 | 2290 | 86% | 2590 | 3030 | 2670 |
| Clark Fork R at St. Regis ¹ | APR-JUL | 1630 | 2360 | 2690 | 85% | 3020 | 3750 | 3160 |
| | APR-SEP | 1910 | 2690 | 3040 | 87% | 3390 | 4160 | 3510 |
| Clark Fork R nr Plains ^{1,2} | APR-JUL | 6060 | 7640 | 8360 | 91% | 9070 | 10600 | 9200 |
| | APR-SEP | 6790 | 8460 | 9220 | 91% | 9980 | 11700 | 10100 |
| Thompson nr Tompson Falls | APR-JUL | 51 | 88 | 113 | 62% | 138 | 175 | 181 |
| | APR-SEP | 63 | 103 | 130 | 63% | 157 | 197 | 205 |
| Prospect Ck at Thompson Falls | APR-JUL | 37 | 54 | 65 | 64% | 76 | 93 | 102 |
| | APR-SEP | 43 | 60 | 72 | 65% | 84 | 101 | 110 |
| Clark Fork R at Whitehorse Rapids ^{1,2} | APR-JUL | 6950 | 8660 | 9440 | 90% | 10200 | 11900 | 10500 |
| | APR-SEP | 7800 | 9620 | 10400 | 90% | 11300 | 13100 | 11500 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Jefferson River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Lima Reservoir Inflow ² | APR-JUL | 36 | 57 | 71 | 95% | 85 | 107 | 75 |
| | APR-SEP | 38 | 61 | 77 | 96% | 93 | 116 | 80 |
| Clark Canyon Inflow ² | APR-JUL | 20 | 56 | 81 | 80% | 105 | 141 | 101 |
| | APR-SEP | 30 | 72 | 100 | 83% | 128 | 169 | 120 |
| Beaverhead R at Barretts ² | APR-JUL | 39 | 81 | 109 | 84% | 137 | 179 | 129 |
| | APR-SEP | 56 | 102 | 134 | 86% | 165 | 210 | 156 |
| Ruby R Reservoir Inflow ² | APR-JUL | 28 | 43 | 53 | 69% | 63 | 78 | 77 |
| | APR-SEP | 37 | 54 | 65 | 71% | 76 | 93 | 91 |
| Big Hole R at Wisdom | APR-JUL | 5 | 49 | 79 | 77% | 108 | 152 | 102 |
| | APR-SEP | 5.5 | 52 | 84 | 78% | 115 | 162 | 108 |
| Big Hole R nr Melrose | APR-JUL | 205 | 335 | 425 | 83% | 515 | 645 | 515 |
| | APR-SEP | 230 | 370 | 465 | 83% | 560 | 700 | 560 |
| Jefferson R nr Twin Bridges ² | APR-JUL | 144 | 360 | 505 | 73% | 650 | 865 | 690 |
| | APR-SEP | 163 | 390 | 545 | 75% | 700 | 925 | 730 |
| Boulder R nr Boulder | APR-JUL | 27 | 47 | 60 | 87% | 73 | 93 | 69 |
| | APR-SEP | 29 | 50 | 65 | 88% | 79 | 101 | 74 |
| Willow Ck Reservoir Inflow ² | APR-JUL | 1.78 | 8.2 | 12.5 | 74% | 16.8 | 23 | 16.8 |
| Jefferson R nr Three Forks ² | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | APR-JUL | 192 | 410 | 560 | 76% | 710 | 930 | 740 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage
End of March, 2016

| Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) | % Average | % Capacity |
|---------------|-----------------|---------------|----------------|-----------|------------|
| | | | | | |



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--------------------------------------|-----------------|--|-----------|-----------|-------|-----------|-----------|-----|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Hebgen Reservoir Inflow ² | APR-JUL | 285 | 335 | 365 | 99% | 395 | 445 | 370 |
| | APR-SEP | 365 | 425 | 465 | 99% | 505 | 565 | 470 |
| Ennis Reservoir Inflow ² | APR-JUL | 430 | 515 | 570 | 91% | 625 | 710 | 625 |
| | APR-SEP | 535 | 635 | 705 | 91% | 775 | 875 | 775 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Madison River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--------------------------------------|-----------------|--|-----------|-----------|-------|-----------|-----------|-----|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Hebgen Reservoir Inflow ² | APR-JUL | 285 | 335 | 365 | 99% | 395 | 445 | 370 |
| | APR-SEP | 365 | 425 | 465 | 99% | 505 | 565 | 470 |
| Ennis Reservoir Inflow ² | APR-JUL | 430 | 515 | 570 | 91% | 625 | 710 | 625 |
| | APR-SEP | 535 | 635 | 705 | 91% | 775 | 875 | 775 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| | | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | | |
|---------------------------------------|---------------------------------------|--|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| | | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| GALLATIN RIVER BASIN | | APR-JUL | 240 | 295 | 335 | 84% | 375 | 430 | 400 |
| | Gallatin R nr Gateway | APR-SEP | 280 | 345 | 390 | 83% | 435 | 500 | 470 |
| Hyalite Reservoir Inflow ² | | APR-JUL | 13.8 | 16 | 17.5 | 88% | 19 | 21 | 20 |
| | Hyalite Reservoir Inflow ² | APR-SEP | 16.1 | 18.4 | 20 | 87% | 22 | 24 | 23 |
| Gallatin R at Logan | | APR-JUL | 157 | 260 | 330 | 75% | 400 | 505 | 440 |
| | Gallatin R at Logan | APR-SEP | 185 | 300 | 380 | 75% | 460 | 575 | 505 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Gallatin River Basin

| | | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | | |
|---------------------------------------|---------------------------------------|--|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| | | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| GALLATIN RIVER BASIN | | APR-JUL | 240 | 295 | 335 | 84% | 375 | 430 | 400 |
| | Gallatin R nr Gateway | APR-SEP | 280 | 345 | 390 | 83% | 435 | 500 | 470 |
| Hyalite Reservoir Inflow ² | | APR-JUL | 13.8 | 16 | 17.5 | 88% | 19 | 21 | 20 |
| | Hyalite Reservoir Inflow ² | APR-SEP | 16.1 | 18.4 | 20 | 87% | 22 | 24 | 23 |
| Gallatin R at Logan | | APR-JUL | 157 | 260 | 330 | 75% | 400 | 505 | 440 |

| | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|
| APR-SEP | 185 | 300 | 380 | 75% | 460 | 575 | 505 |
|---------|-----|-----|-----|-----|-----|-----|-----|

- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | 30yr Avg (KAF) |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Missouri R at Toston ² | APR-JUL | 815 | 1180 | 1430 | 80% | 1680 | 2040 | 1790 |
| | APR-SEP | 940 | 1370 | 1660 | 80% | 1950 | 2380 | 2070 |
| Dearborn R nr Craig | | | | | | | | |
| Missouri R at Fort Benton ² | APR-JUL | 1160 | 1710 | 2090 | 80% | 2470 | 3020 | 2610 |
| | APR-SEP | 1420 | 2070 | 2510 | 81% | 2950 | 3600 | 3110 |

| | | | | | | | | |
|--|---------|------|------|------|-----|-------|-------|------|
| Missouri R nr Virgelle ² | APR-JUL | 1350 | 1960 | 2380 | 79% | 2800 | 3410 | 3000 |
| | APR-SEP | 1600 | 2320 | 2810 | 80% | 3300 | 4020 | 3520 |
| Missouri R nr Landusky ² | APR-JUL | 1420 | 2070 | 2510 | 79% | 2950 | 3600 | 3160 |
| | APR-SEP | 1690 | 2460 | 2980 | 80% | 3500 | 4270 | 3720 |
| Missouri R bl Fort Peck Dam ² | APR-JUL | 1300 | 1970 | 2420 | 75% | 2870 | 3540 | 3240 |
| | APR-SEP | 1260 | 2140 | 2740 | 74% | 3340 | 4220 | 3700 |
| Lake Sakakawea Inflow ² | APR-SEP | 5660 | 7800 | 9250 | 98% | 10700 | 12800 | 8310 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Missouri Mainstem Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| Missouri R at Toston ² | APR-JUL | 815 | 1180 | 1430 | 80% | 1680 | 2040 | 1790 |
| | APR-SEP | 940 | 1370 | 1660 | 80% | 1950 | 2380 | 2070 |
| Dearborn R nr Craig | | | | | | | | |
| Missouri R at Fort Benton ² | APR-JUL | 1160 | 1710 | 2090 | 80% | 2470 | 3020 | 2610 |
| | APR-SEP | 1420 | 2070 | 2510 | 81% | 2950 | 3600 | 3110 |
| Missouri R nr Virgelle ² | APR-JUL | 1350 | 1960 | 2380 | 79% | 2800 | 3410 | 3000 |
| | APR-SEP | 1600 | 2320 | 2810 | 80% | 3300 | 4020 | 3520 |
| Missouri R nr Landusky ² | APR-JUL | 1420 | 2070 | 2510 | 79% | 2950 | 3600 | 3160 |
| | APR-SEP | 1690 | 2460 | 2980 | 80% | 3500 | 4270 | 3720 |
| Missouri R bl Fort Peck Dam ² | APR-JUL | 1300 | 1970 | 2420 | 75% | 2870 | 3540 | 3240 |
| | APR-SEP | 1260 | 2140 | 2740 | 74% | 3340 | 4220 | 3700 |
| Lake Sakakawea Inflow ² | APR-SEP | 5660 | 7800 | 9250 | 98% | 10700 | 12800 | 8310 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Sheep Ck nr White Sulphur Springs | APR-JUL | 4.1 | 7.4 | 9.6 | 62% | 11.8 | 15 | 15.5 |
| | APR-SEP | 5.4 | 9.1 | 11.6 | 63% | 14.1 | 17.8 | 18.4 |
| Smith R bl Eagle Ck ² | APR-JUL | 17.3 | 49 | 70 | 66% | 91 | 123 | 106 |
| | APR-SEP | 17.4 | 54 | 79 | 68% | 103 | 140 | 116 |
| NF Musselshell R nr Delpine | | | | | | | | |
| SF Musselshell R ab Martinsdale | APR-SEP | 1 | 13.2 | 27 | 71% | 41 | 61 | 38 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Musselshell R at Harlowton ² | APR-SEP | -1 | 8 | 23 | 39% | 38 | 59 | 59 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Musselshell R nr Roundup ² | APR-SEP | -43 | -26 | 1.93 | 3% | 47 | 114 | 66 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Smith-Judith-Musselshell

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|-----------------------------------|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Sheep Ck nr White Sulphur Springs | APR-JUL | 4.1 | 7.4 | 9.6 | 62% | 11.8 | 15 | 15.5 |
| | APR-SEP | 5.4 | 9.1 | 11.6 | 63% | 14.1 | 17.8 | 18.4 |
| Smith R bl Eagle Ck ² | APR-JUL | 17.3 | 49 | 70 | 66% | 91 | 123 | 106 |
| | APR-SEP | 17.4 | 54 | 79 | 68% | 103 | 140 | 116 |

| | | | | | | | | |
|---|---------|-----|------|------|-----|----|-----|----|
| NF Musselshell R nr Delpine | | | | | | | | |
| SF Musselshell R ab Martinsdale | APR-SEP | 1 | 13.2 | 27 | 71% | 41 | 61 | 38 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Musselshell R at Harlowton ² | APR-SEP | -1 | 8 | 23 | 39% | 38 | 59 | 59 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Musselshell R nr Roundup ² | APR-SEP | -43 | -26 | 1.93 | 3% | 47 | 114 | 66 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| Gibson Reservoir Inflow | APR-JUL | 230 | 290 | 330 | 84% | 370 | 430 | 395 |
| | APR-SEP | 255 | 320 | 365 | 83% | 405 | 470 | 440 |
| Two Medicine R nr Browning ² | APR-JUL | 102 | 133 | 153 | 84% | 174 | 205 | 183 |
| | APR-SEP | 110 | 142 | 163 | 84% | 185 | 215 | 194 |
| Badger Ck nr Browning | APR-JUL | 46 | 63 | 75 | 85% | 86 | 104 | 88 |
| | APR-SEP | 56 | 75 | 88 | 85% | 101 | 120 | 103 |

| | | APR-JUL | 28 | 39 | 47 | 82% | 55 | 67 | 57 |
|---------------------------------|--|---------|------|-----|-----|-----|------|------|------|
| | | APR-SEP | 35 | 48 | 56 | 84% | 65 | 78 | 67 |
| Dupuyer Ck nr Valier | | APR-JUL | 1.61 | 5.3 | 7.7 | 69% | 10.2 | 13.9 | 11.1 |
| | | APR-SEP | 2.3 | 6.2 | 8.9 | 70% | 11.5 | 15.5 | 12.7 |
| Cut Bank Ck nr Browning | | APR-JUL | 33 | 48 | 58 | 84% | 68 | 83 | 69 |
| | | APR-SEP | 35 | 51 | 62 | 83% | 73 | 89 | 75 |
| Marias R nr Shelby ² | | APR-JUL | 129 | 220 | 280 | 78% | 345 | 435 | 360 |
| | | APR-SEP | 133 | 225 | 290 | 77% | 355 | 450 | 375 |
| Teton R nr Dutton | | APR-JUL | 5 | 21 | 39 | 93% | 57 | 85 | 42 |
| | | APR-SEP | 5 | 24 | 44 | 92% | 64 | 93 | 48 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Sun-Teton-Marias Basins

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| Gibson Reservoir Inflow | APR-JUL | 230 | 290 | 330 | 84% | 370 | 430 | 395 |
| | APR-SEP | 255 | 320 | 365 | 83% | 405 | 470 | 440 |
| Two Medicine R nr Browning ² | APR-JUL | 102 | 133 | 153 | 84% | 174 | 205 | 183 |
| | APR-SEP | 110 | 142 | 163 | 84% | 185 | 215 | 194 |
| Badger Ck nr Browning | APR-JUL | 46 | 63 | 75 | 85% | 86 | 104 | 88 |
| | APR-SEP | 56 | 75 | 88 | 85% | 101 | 120 | 103 |
| Swift Reservoir Inflow ² | APR-JUL | 28 | 39 | 47 | 82% | 55 | 67 | 57 |
| | APR-SEP | 35 | 48 | 56 | 84% | 65 | 78 | 67 |
| Dupuyer Ck nr Valier | APR-JUL | 1.61 | 5.3 | 7.7 | 69% | 10.2 | 13.9 | 11.1 |
| | APR-SEP | 2.3 | 6.2 | 8.9 | 70% | 11.5 | 15.5 | 12.7 |
| Cut Bank Ck nr Browning | APR-JUL | 33 | 48 | 58 | 84% | 68 | 83 | 69 |
| | APR-SEP | 35 | 51 | 62 | 83% | 73 | 89 | 75 |
| Marias R nr Shelby ² | APR-JUL | 129 | 220 | 280 | 78% | 345 | 435 | 360 |
| | APR-SEP | 133 | 225 | 290 | 77% | 355 | 450 | 375 |
| Teton R nr Dutton | APR-JUL | 5 | 21 | 39 | 93% | 57 | 85 | 42 |
| | APR-SEP | 5 | 24 | 44 | 92% | 64 | 93 | 48 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| ST. MARY & MILK BASINS | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | 30yr Avg (KAF) |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Lake Sherburne Inflow | APR-JUL | 68 | 80 | 89 | 92% | 98 | 110 | 97 |
| | APR-SEP | 79 | 93 | 102 | 91% | 111 | 125 | 112 |
| Two Medicine R nr Browning ² | APR-JUL | 260 | 310 | 345 | 93% | 380 | 430 | 370 |
| | APR-SEP | 295 | 350 | 390 | 92% | 430 | 485 | 425 |
| Badger Ck nr Browning | APR-JUL | 290 | 360 | 405 | 93% | 450 | 520 | 435 |
| | APR-SEP | 345 | 420 | 470 | 93% | 520 | 595 | 505 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

St. Mary River Basin

| ST. MARY & MILK BASINS | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | 30yr Avg (KAF) |
|---|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Lake Sherburne Inflow | APR-JUL | 68 | 80 | 89 | 92% | 98 | 110 | 97 |
| | APR-SEP | 79 | 93 | 102 | 91% | 111 | 125 | 112 |
| Two Medicine R nr Browning ² | APR-JUL | 260 | 310 | 345 | 93% | 380 | 430 | 370 |
| | APR-SEP | 295 | 350 | 390 | 92% | 430 | 485 | 425 |
| Badger Ck nr Browning | APR-JUL | 290 | 360 | 405 | 93% | 450 | 520 | 435 |
| | APR-SEP | 345 | 420 | 470 | 93% | 520 | 595 | 505 |

- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | 30yr Avg (KAF) |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Yellowstone R at Yellowstone Lake Outlet | APR-JUL | 535 | 615 | 670 | 117% | 725 | 805 | 575 |
| | APR-SEP | 715 | 820 | 895 | 116% | 970 | 1080 | 770 |
| Yellowstone R at Corwin Springs | APR-JUL | 1400 | 1590 | 1710 | 108% | 1830 | 2020 | 1590 |
| | APR-SEP | 1640 | 1860 | 2010 | 107% | 2160 | 2380 | 1880 |
| Yellowstone R at Livingston | APR-JUL | 1570 | 1800 | 1960 | 109% | 2120 | 2350 | 1800 |
| | APR-SEP | 1850 | 2120 | 2300 | 107% | 2480 | 2750 | 2140 |
| Shields R nr Livingston | APR-JUL | 10.7 | 54 | 83 | 64% | 112 | 155 | 129 |
| | APR-SEP | 14 | 60 | 91 | 64% | 121 | 167 | 143 |

| | | | | | | | | |
|--|---------|------|------|------|------|------|------|------|
| Boulder R at Big Timber | APR-JUL | 162 | 215 | 250 | 89% | 285 | 340 | 280 |
| | APR-SEP | 173 | 230 | 270 | 90% | 310 | 365 | 300 |
| Mystic Lake Inflow ² | APR-JUL | 47 | 53 | 57 | 97% | 61 | 67 | 59 |
| | APR-SEP | 60 | 67 | 72 | 97% | 77 | 84 | 74 |
| Stillwater R nr Absarokee ² | APR-JUL | 300 | 375 | 425 | 96% | 475 | 550 | 445 |
| | APR-SEP | 355 | 440 | 495 | 95% | 550 | 635 | 520 |
| Clarks Fk Yellowstone R nr Belfry | APR-JUL | 510 | 585 | 635 | 125% | 685 | 760 | 510 |
| | APR-SEP | 555 | 635 | 695 | 126% | 750 | 830 | 550 |
| Cooney Reservoir Inflow | APR-JUL | 9.3 | 22 | 30 | 79% | 38 | 51 | 38 |
| | APR-SEP | 15.4 | 29 | 38 | 79% | 47 | 60 | 48 |
| Yellowstone R at Billings | APR-JUL | 2420 | 2990 | 3370 | 104% | 3750 | 4320 | 3230 |
| | APR-SEP | 2780 | 3430 | 3880 | 104% | 4330 | 4980 | 3730 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Upper Yellowstone River Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Yellowstone R at Yellowstone Lake Outlet | APR-JUL | 535 | 615 | 670 | 117% | 725 | 805 | 575 |
| | APR-SEP | 715 | 820 | 895 | 116% | 970 | 1080 | 770 |
| Yellowstone R at Corwin Springs | APR-JUL | 1400 | 1590 | 1710 | 108% | 1830 | 2020 | 1590 |
| | APR-SEP | 1640 | 1860 | 2010 | 107% | 2160 | 2380 | 1880 |
| Yellowstone R at Livingston | APR-JUL | 1570 | 1800 | 1960 | 109% | 2120 | 2350 | 1800 |
| | APR-SEP | 1850 | 2120 | 2300 | 107% | 2480 | 2750 | 2140 |
| Shields R nr Livingston | APR-JUL | 10.7 | 54 | 83 | 64% | 112 | 155 | 129 |
| | APR-SEP | 14 | 60 | 91 | 64% | 121 | 167 | 143 |
| Boulder R at Big Timber | APR-JUL | 162 | 215 | 250 | 89% | 285 | 340 | 280 |
| | APR-SEP | 173 | 230 | 270 | 90% | 310 | 365 | 300 |
| Mystic Lake Inflow ² | APR-JUL | 47 | 53 | 57 | 97% | 61 | 67 | 59 |
| | APR-SEP | 60 | 67 | 72 | 97% | 77 | 84 | 74 |
| Stillwater R nr Absarokee ² | APR-JUL | 300 | 375 | 425 | 96% | 475 | 550 | 445 |
| | APR-SEP | 355 | 440 | 495 | 95% | 550 | 635 | 520 |

| | | | | | | | | |
|-----------------------------------|---------|------|------|------|------|------|------|------|
| Clarks Fk Yellowstone R nr Belfry | APR-JUL | 510 | 585 | 635 | 125% | 685 | 760 | 510 |
| | APR-SEP | 555 | 635 | 695 | 126% | 750 | 830 | 550 |
| Cooney Reservoir Inflow | APR-JUL | 9.3 | 22 | 30 | 79% | 38 | 51 | 38 |
| | APR-SEP | 15.4 | 29 | 38 | 79% | 47 | 60 | 48 |
| Yellowstone R at Billings | APR-JUL | 2420 | 2990 | 3370 | 104% | 3750 | 4320 | 3230 |
| | APR-SEP | 2780 | 3430 | 3880 | 104% | 4330 | 4980 | 3730 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions



| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | |
| Bighorn R nr St. Xavier ² | APR-JUL | 1530 | 1910 | 2160 | 157% | 2410 | 2780 | 1380 |
| | APR-SEP | 1650 | 2060 | 2330 | 160% | 2610 | 3020 | 1460 |
| Little Bighorn R nr Hardin | APR-JUL | 34 | 68 | 91 | 93% | 114 | 148 | 98 |
| | APR-SEP | 40 | 78 | 103 | 93% | 128 | 165 | 111 |
| Tongue R nr Dayton ² | APR-JUL | 43 | 62 | 74 | 86% | 87 | 105 | 86 |
| | APR-SEP | 52 | 72 | 85 | 87% | 99 | 119 | 98 |
| Big Goose Ck nr Sheridan | APR-JUL | 20 | 32 | 39 | 85% | 47 | 58 | 46 |
| | APR-SEP | 27 | 39 | 47 | 87% | 55 | 67 | 54 |
| Little Goose Ck nr Bighorn | APR-JUL | 15.1 | 22 | 28 | 90% | 33 | 40 | 31 |
| | APR-SEP | 22 | 30 | 35 | 90% | 40 | 48 | 39 |
| Tongue River Reservoir Inflow ² | APR-JUL | 80 | 142 | 184 | 95% | 225 | 290 | 193 |
| | APR-SEP | 95 | 160 | 205 | 95% | 250 | 315 | 215 |
| Yellowstone R at Miles City ² | APR-JUL | 4060 | 4990 | 5620 | 118% | 6250 | 7180 | 4780 |
| | APR-SEP | 4560 | 5660 | 6410 | 118% | 7160 | 8260 | 5450 |
| Powder R at Moorehead | APR-JUL | 43 | 122 | 176 | 99% | 230 | 310 | 177 |
| | APR-SEP | 59 | 139 | 194 | 99% | 250 | 330 | 196 |

| | | | | | | | | |
|--------------------------------------|---------|------|------|------|------|------|------|------|
| Powder R nr Locate | APR-JUL | 49 | 138 | 199 | 100% | 260 | 350 | 199 |
| | APR-SEP | 60 | 154 | 220 | 100% | 280 | 375 | 220 |
| Yellowstone R nr Sidney ² | APR-JUL | 4040 | 5040 | 5720 | 118% | 6400 | 7390 | 4830 |
| | APR-SEP | 4440 | 5640 | 6450 | 119% | 7260 | 8450 | 5430 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Lower Yellowstone River

Basin

| Forecast Point | Forecast Period | Chance Actual Volume Will Exceed Forecasted Volume | | | | | | |
|--|-----------------|--|-----------|-----------|-------|-----------|-----------|----------------|
| | | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| Bighorn R nr St. Xavier ² | APR-JUL | 1530 | 1910 | 2160 | 157% | 2410 | 2780 | 1380 |
| | APR-SEP | 1650 | 2060 | 2330 | 160% | 2610 | 3020 | 1460 |
| Little Bighorn R nr Hardin | APR-JUL | 34 | 68 | 91 | 93% | 114 | 148 | 98 |
| | APR-SEP | 40 | 78 | 103 | 93% | 128 | 165 | 111 |
| Tongue R nr Dayton ² | APR-JUL | 43 | 62 | 74 | 86% | 87 | 105 | 86 |
| | APR-SEP | 52 | 72 | 85 | 87% | 99 | 119 | 98 |
| Big Goose Ck nr Sheridan | APR-JUL | 20 | 32 | 39 | 85% | 47 | 58 | 46 |
| | APR-SEP | 27 | 39 | 47 | 87% | 55 | 67 | 54 |
| Little Goose Ck nr Bighorn | APR-JUL | 15.1 | 22 | 28 | 90% | 33 | 40 | 31 |
| | APR-SEP | 22 | 30 | 35 | 90% | 40 | 48 | 39 |
| Tongue River Reservoir Inflow ² | APR-JUL | 80 | 142 | 184 | 95% | 225 | 290 | 193 |
| | APR-SEP | 95 | 160 | 205 | 95% | 250 | 315 | 215 |
| Yellowstone R at Miles City ² | APR-JUL | 4060 | 4990 | 5620 | 118% | 6250 | 7180 | 4780 |
| | APR-SEP | 4560 | 5660 | 6410 | 118% | 7160 | 8260 | 5450 |
| Powder R at Moorehead | APR-JUL | 43 | 122 | 176 | 99% | 230 | 310 | 177 |
| | APR-SEP | 59 | 139 | 194 | 99% | 250 | 330 | 196 |
| Powder R nr Locate | APR-JUL | 49 | 138 | 199 | 100% | 260 | 350 | 199 |
| | APR-SEP | 60 | 154 | 220 | 100% | 280 | 375 | 220 |
| Yellowstone R nr Sidney ² | APR-JUL | 4040 | 5040 | 5720 | 118% | 6400 | 7390 | 4830 |
| | APR-SEP | 4440 | 5640 | 6450 | 119% | 7260 | 8450 | 5430 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions